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THE EFFECT OF EXCHANGE RATE CHANGES ON THE PRICES IN KOREA

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I. INTRODUCTION

The appreciation of the Won has been of central concern to economic policy markers. A change in the foreign exchange value of the Won has important implications. One of particular importance to Korea economic policy is the extent to which the appreciation falls prices and the resulting loss of Korea competitiveness from comparatively more expensive exports and less expensive imports. A casual look at recent experience with exchange rate and price movements lends credence to this concern. The strong Won helps in the winding-down of inflationary momentum by directly lowering the prices of many imports. And it intensifies pressures on Korea producers to hold down prices and wages in the face of stiffer competition from foreign producers both in Korea markets and in export markets. Table 1 shows that a depreciation of the won has been accompanied by a higher inflation rate; and an exchange rate appreciation invariably has been linked with a lower inflation rate. This paper evaluates whether changes in the exchange rate actually have important effects on the price level. Section Ⅱ presents an overview of recent exchange rate movements in Korea. Section Ⅲ deals with the specification of our model, Section Ⅳ evaluate the empirical estimates for individual coefficients. Section V presents a conclusion.

Ⅱ. RECENT EXCHANGE RATE MOVEMENTS IN KOREA

Exchange rate movements are thought to affect the domestic price level mainly through the prices of imports : exchange rate appreciation makes import cheaper; this in turn retards increases in the prices of domestic goods through cheaper imported inputs and through competition from cheaper finished imported goods. The imports deflator, shown in Table 1, has fallen sharply for the last three years, a period when Korea inflation was slowing. The confluence in the movements of the exchange rate, import prices, and the domestic price level certainly gives the impression that the external sector in the past few years has been an important factor in explaining Korea inflation.

We examine the extent of the recent appreciation (overvaluation) of the Korean currency, which is the main factor in the switch from a fixed exchage rate to a flexible exchange rate regime in Korea. We use the effective exchange rate index to assess whether the Korean currency (won) has appreciated in recent years. Effective exchange rates provide a quantitative measure of the change in the Korea's exchange rate in

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terms of the currencies of a given set of countries, relative to a specified base period. Here there is a fundamental ambiguity, for one can equally well define the exchange rate as the price of domestic currency in terms of foreign currency or as the price of foreign currency in terms of domestic currency. While in principle these two definitions would seem to represent essentially the same thing, the corresponding effective exchange rate indices differ markedly, depending on the precise definition of the exchange rate employed. We use the second definintions as follws[1].

Effective Exchange Rate $= 100 \times W_i R_{it} / R_{i0}$

where $W_i =$ trade weight[2]

$R_{it} =$ the price of Korean currency at time t in terms of the currency of the ith country.

Under the flexible exchange rate introduced in January 1980, the exchange rate of the won vis-a-vis the dollar was to be determined on the basis of movements of a currency basket and other factors affecting Korea's external position. Table 1 shows the movement of the effective exchange rate index of the Korean currency since 1980. During 1975 - 1978, the nominal exchange rate depreciated by 15% in line with the movements of the dollar, but the effective exchange rate appreciated in real terms because prices rose faster in Korea than in its trading partner countries in 1979. The divergence in price developments was compounded by a substantial appreciation of the dollar in line with the movement of the dollar during the period. As a result, the real effective exchange rate further appreciated, contributing to the weak performance of exports.

The nominal exchange rate seems to have peaked between the 4th quarter of 1985 to the first quarter of 1986, and has continued to decline until now. A trend of real appreciation continued through the late 1970s until 1979, implying that the fixed exchange rate system was not adequate to accomodate the then-high domestic inflation.

Ⅲ. SPECIFICATION OF MODEL

There are at least four channels through which the exchange rate can affect the price level. The first is the prices of imported consumer goods, which directly affect the consumer price index. The second is the prices of imported inputs, which directly affect costs of production. An important question concerning these first two channels is whether the foreign prices of the imports are given and hence whether an exchange

1) It has occasionally been argued that the second definition is more appropriate for the calculation of import-weighted indices since it reflects the price of foreign exchange confronting domestic importers and conversely that the first definition is more appropriate to the construction of export-weighted indices.

2) Currently, the weight is based on the SDR basket and Korea's own trade weighted basket. Korea's own currency basket contains five national currencies, the U. S. dollar, the Japanese yen, the German mark, the British pound, and the Canadian dollar.

[Table 1] Korea's Exchange Rates (1985. Ⅲ - 1986. Ⅱ = 100)

Year	Current Account Balance		Nominal Exchange Rate Index	Real Effective Exchange Rate			
	Million US$	Ratio to GNP(%)	End of Period	REER1[1]	REER2[2] (Deflator : WPI)	CPI	IMP[3]
1970	- 623	- 7.8	35.64	79.45	83.88	· ·	· ·
1971	- 848	- 9.1	42.01	84.69	90.64	25.2	36.6
1972	- 371	- 3.5	44.90	92.29	98.45	28.1	38.6
1973	- 309	- 2.3	44.74	104.45	111.52	29.0	47.8
1974	- 2023	- 10.9	54.48	89.56	96.63	36.1	60.3
1975	- 1887	- 9.0	54.48	90.24	97.02	45.2	57.3
1976	- 314	- 1.1	54.48	83.88	89.78	52.1	58.3
1977	12	0.0	54.48	83.56	88.35	57.4	59.3
1978	- 1085	- 2.1	54.48	85.60	88.41	65.7	61.9
1979	- 4151	- 6.7	54.48	78.99	82.94	77.7	78.4
1980	- 5321	- 8.7	74.28	81.29	85.57	100	100
1981	- 4646	- 6.9	78.85	79.02	81.54	121.3	104.0
1982	- 2650	- 3.5	84.28	78.54	81.55	130.1	98.7
1983	- 1606	- 2.1	89.54	83.97	85.48	134.5	94.4
1984	- 1373	- 1.7	93.13	86.74	87.22	137.6	94.4
1985	- 887	- 1.0	100.20	91.96	92.14	141.0	90.7
1986	4617	4.8	96.96	105.65	105.25	144.2	84.0
1985							
Ⅰ	- 647	- 5.1	95.71	85.76	85.84	140.7	90.7
Ⅱ	- 385	- 2.8	98.35	90.18	90.41	141.2	90.8
Ⅲ	268	1.8	100.37	93.66	94.37	142.3	89.7
Ⅳ	- 123	- 0.7	100.20	99.31	99.10	142.6	89.9
1986							
Ⅰ	- 438	- 3.3	99.64	102.41	101.99	143.6	88.0
Ⅱ	889	5.7	99.79	106.24	105.57	144.4	83.5
Ⅲ	2023	11.9	98.70	108.35	107.53	145.1	82.3
Ⅳ	2142	9.8	96.96	105.60	105.89	144.5	83.9
1987							
Ⅰ	1966	12.3	95.33	107.16	108.35	146.0	81.3
Ⅱ	2141	N. A.	91.05	106.03	106.03	148.2	82.9

Notes : 1) REER1 : based on Korea's trade weights with 7 major countries for 1985-86.
2) REER2 : based on multilateral weights in which Korea's export shares (1985 - 1986) to 11 competitor countries and their market shares (1983) in each others' markets are jointly considered.
3) IMP : import price deflators (1980=100)

Sources : Adapted from Korea's Exchange Rate Policy System, - effect and issues - Sung Hee Jwa

rate movement passes entirely onto the Korea price of the imports. The third is aggregate demand via the trade multiplier; exchange rate movements change the current account position, which in turn affects aggregate demand.

The fourth is foreign prices, which affect the prices of domestically produced competing goods. The effect through this channel is difficult to model because it involves price-setting behavior in sectors of the economy characterized by imperfect competition. If this channel is effective, the price of Korea exports ought to depend on the price of competing goods in foreign markets, and the price of Korea goods that compete with imports should be affected by the won price of these imports. These actions in the domestic tradable goods sector hence tend to raise the price level when the exchange rate depreciates and to lower it when exchange rate appreciates.

The importance of these foreign price effects depends, among other things, on the size of Korea supply and demand in the world market. If the Korea market is small, foreign prices are fixed in foreign currencies. At the opposite extreme, if the Korea market is very large, then the won prices of tradable goods may be largely independent of exchange rate movements, because both Korea and foreign firms will price to the Korea market. But relative market size is only one of the factors that cloud the relationship between the exchange rate and prices of tradable goods. Strategic considerations and institutional factors are also important in oligopolistic situations.

Although a reduced-form relationship between the exchange rate the price level cannot be derived, a structural relationship between them can be specified based on the channels of influence described above. This structural relationship presumes that pricing behavior for a sizable portion of the economy can be characterized by some version of markup over unit costs[3]. Such a cost-markup model is inappropriate when applied either to sectors with perfect competition or to sectors that are effectively cartelized. A good example of the former is the market for homogeneous agricultural products, for which climatic conditions can be more important than labor cost in determining prices. If the Korea market is only a small part of the global market, it may be appropriate to think of these products as having a world price fixed in terms of a basket of currencies and of each country as being a price taker. Then the degree to which exchange rate changes are passed through should be larger for agricultural products than for manufactured goods.

To examine the effect of the exchange rate on import and export prices separately from the effect of these prices on the price level, we estimate empirically three types of equations : (a) price of imports goods, (b) domestic absorption deflator, (c) price of exports goods.

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3) Motivation of such a relationship is given in william Nordhaus, "Recent Developments in Price Dynamics," in Otto Eckstein, ed., The Econometrics of Price Determination, Washington, D. C. Federal Reserve Board, 1970, pp. 16-49.

Equations of Price Indexes

(a) Price of Imports Goods (Import unit value index)

The import unit value index function depends on the exchange rate and the average of foreign trade partner countries' export unit value index. The price of imported goods is a weighted average of the price of primary products and the prices of exported goods of the relevant exporting countries, all converted into Korean currency units (won) by the bilateral exchange rates, since the price of imported goods is the linear combination of the foreign export price and its exchange rate. It represents the effects of foreign competitiveness on domestic prices.

(1) $PMG = PMG(EI(PP, (W^u * EI * UPXGUV + W^j * (EI/JEI) * JPXGUV))$

where

PMG = the price of imports goods and services
PP = the price of imported primary products
W^u, W^j = the trade share weight of the U. S. and Japan
$JPXGUV$ = Japan's export unit value index expressed in yen
$UPXGUV$ = U. S.' export unit value index expressed in dollars
EI = Korea's spot exchange rate (won per dollar)
JEI = Japan's spot exchange rate (yen per dollar)

The prices of foreign export goods are explained by a weighted geometric average of the export unit values of the U. S. and Japan expressed in Korean currency. Because of the lack of data, the rest of the world countries are not included in the average. Foreign countries' export price index are combined in a weighted average, where the weights are shares of merchandise imports from each country. We use the weighted sum index of the oil price index and the imported food price index as a proxy for the price of primary products, in which each weight is 0. 8 and 0. 2, since the share of oil and food imports among total primary product imports is 0. 8 and 0. 2 respectively. The resulting price equationa is as follows;

(2) $log(PMG) = a + blog(EI * PP) + clog(EI * WUJ)$

$b, c > 0$

where

PP = weighted index of food and oil price index
$WUJ = W^u * UPXGUV + W^j * JPXGUV/JEI$ (JEI=yen/dollar)
= weighted average of foreign countries' export unit value index

(b) Domestic Absorption Deflator

The equation that serves as the basis for the domestic absorption becomes the following.

$$(3)\quad log(PC) = a + blog(CU) + clog(WR) + dlog(UC) + elog(EI) + flog(WUJ) + glog(PMG) + hlog(PP) + iT$$

$$b, c, d, e, g, h, i) 0 \qquad f(0$$

where

CU = capacity utilization
WR = wage rate
UC = real user's cost
PMG = the price of imported goods and services
WUJ = weighted average of foreign countries' export unit value index
T = time trend

Domestic price setting behavior is described by a markup over marginal cost, where price is set at some markup above the variable cost of production[4]. In reality, the market structure of manufacturing sector takes the monopolistic form in Korea. Therefore, the price is determined by the process of negotiation between the government authorities and the producers. The markup factor is assumed to vary with fixed costs of production and with domestic and foreign demand for the firm's product. We choose the capacity utilization as the proxy for excess demand in the markup term expression[5]. On the basis of the neoclassical theory of production, the price equation can be derived from the Kuhn-Tucker profit maximization condition. It yields an equation for the domestic absorption deflator in terms of the wage rate, the user's cost of capital, and imported prices. The price of imported primary products and the price of imported goods and services represent import price effect of domestic absorption deflator. The import prices summarizes the following channels. First, changes in prices of imported goods or materials may directly affect prices of absorption deflator or producer goods according to their import content. Second, changes in import prices may affect the prices of domestically produced substitutes through market forces. Third, increases in prices of imported raw materials may enlarge the value added of final goods as they are pyramided through the vertical market structure with fixed margins. The firm is assumed to respond to changes its foreign competitors' prices and the exchange rate. Time trend represents a technical growth rate over time.

(c) Price of Exports Goods (Export unit value index)

The prices of export goods is as follows.

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4) See, Eckstein, Otto, *The Econometrics of Price Determination*, Board of Governors of the Federal Reserve System, 1976, Bruno, M., "Price and Output Adjustment : Micro Foundations and Macro Theory," *Journal of Monetary Economics* 1979, vol. 2 pp. 187-212.

5) See, George De Menil, "Aggregate Price Dyamics," *Review of Economics and Statistics* vol. 56 May 1974, pp. 129-140.

$$(4)\quad log(PXG) = a + bT + clog(WR) + dlog(UC) + elog(EI) + flog(PP) + glog(WUJ)$$

$$b, c, d, f, g) 0 \quad e\langle 0$$

Exporters are not likely to have the degree of monopoly power in their export market that they are able to exercise in their domestic market. In its export market, the firm is subject to competitive pressures from suppliers in other countries. Therefore, we drop the capacity utilization variable as a proxy for the markup term. Price of export goods is partially determined by both domestic factor variables and foreign competitors' prices, since the major commodity's import shares among total imports from Korea has risen from 5.6 percent to 11 percent to U.S. and from 5.8 to 14.9 percent to Japan during the period of 1971 to 1986[6]. It implies that the price of exports goods depend on costs, since production is subject to constant or near-constant returns to scale. Since direct international transmission of inflation occurs partly through tradable goods prices, it is important to stress that export prices are a function of domestic developments which raise the export prices of Korea may affect prices in other countries by increasing the prices of imports to latter. The export price indexes of foreign countries, in terms of the domestic currency, are included to account for the effect of competitors' prices. The competitive price term can be decomposed into exchange rate (EI) and foreign export price terms. The competitive price term can be broken down into exchange rate (EI) and foreign export price terms in order to separate the effect of foreign price and the exchange rate. The price of imported primary products (PP) represents the intermediate input price effects on the price of export goods. Time trend stands for a technical growth rate over time.

IV. THE EMPIRICAL EVIDENCE

The predicted values reflect the actual values reasonably well. Our hypothesis about domestic price determination is based on a markup model. Markups over normal costs are modified by excess demand relative to supply. The capacity utilization variable as a proxy for excess demand is insignificant in domestic absorption deflator equation. On the other hand, the demand variable for the wholesale price index has the wrong sign. But this is not surprising since aggregate demand affects prices of goods largely through its influence on the various cost variables. Supply side variables were more important in determining the price than the demand variable. Most of the cost variables are highly significant. The effects of import prices on domestic prices are all significantly positive and similar to the ratios of imports to GNP.

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6) We observe that Korea's trade with the United States and Japan concentrate on the particular commodity groups. This factor allows us to relax the small country assumption, even though current Korea's trade volume shares 1 percent in the total world trade.

Both the quantitative results and qualitative implications of the input cost variables are quite striking. The coefficients turned out to be at least as significant as those for the wage variables. Table 2 shows the elasticities of wages, of rental costs, and material costs evaluated at the mean. The direct effects were computed only for those terms with a t-ratio greater than one, taking into consideration both the joint test as well as the individual tests.

In these results, the price was relatively more elastic with respect to imported intermediate goods than with respect to user's cost. It should be emphasized at this point that the elasticities of prices of imported services and imported materials are typically larger than those of direct wage rates and users' costs; since in Korea the

[Table 2] Direct Effects and Long Run Elasticities for the Selected Variables

Variables	*WR*	*UC*	*PMG*	*PP*	*WUJ*
PC	0.051	0.131	0.369	0.091	0.624
	(0.200)	(0.057)	(0.680)	(0.120)	(0.298)
WPI	0.131	0.219	0.440	0.137	0.078
	(0.018)	(0.333)	(0.731)	(0.159)	(0.262)
PXG	0.016	0.065		0.114	0.047
	(0.01)	(0.035)		(0.091)	(0.081)

Sources : Table 3 through 5
The long run elasticity is presented in parentheses

particular materials included often account for a larger share in the direct cost of a product than direct labor and users' costs do in Korea. However, this is not necessarily true of indirect effects; indirect effects give us a much broader perspective on price behavior than do the direct effects considered alone. we compute the long run elasticity.[7] The indirect effects of wages for *PC* are stronger than the indirect effects of rental costs, since the domestic absorption deflator includes labor-intensive goods. On the other hand, the indirect effects of rental costs and the imported prices for the wholesale price index are more significant than those of wage rates, since the WPI contains more capital-intensive goods and tradable goods in Korea.

Let us turn to the coefficient of the prices of imported goods. They are significant at the 1 percent critical level. To supplement the t-test, we perform an F-test to see whether the exclusion of the price of imported services and the foreign export price variables greatly reduces the explanatory power of the model. Equation b in table 3 and b in table 4 are those obtained when the coefficient of the imported price and the foreign export price variables in each equation is constrained to zero. The

7) The coputational formula for a long run elasticity is as follows. A typical instantaneous equilibrium model can be formulated to consider the adjustment process of the actual price from t-1 to year t in proportion to the discrepancy between the desired level and actual price in year t-1.
$log\ PC_t = \lambda Log(PC) + (1-\lambda)\ Log(PC_{t-1})$
where $0 < \lambda < 1$

〔Table 3〕 Estimates of Domestic Absorption deflator (1973. I-1986. Ⅱ)

a) $log(PC) = -1.975 + 0.051\,log(WR) - 0.004\,log(EI)$
$(-1.863)\quad (3.707)\quad (-0.924)$
$+ 0.624\,log(WW) + 0.131\,log(UC) + 0.091\,log(PP)$
$(4.707)\quad (2.028)\quad (2.44)$
$+ 0.369\,log(PMG) + 0.009\,T + 0.099\,log(CU)$
$(2.13)\quad (1.44)\quad (1.301)$
$R^2 = 0.98 \qquad D\text{-}W = 1.36$
$F(8, 34) = 419.87$ Estimation Method = CORC

b) $log(PC) = 3.997 + 0.008\,log(WR) + 0.006\,log(EI) + 0.022\,T$
$(6.448)\quad (1.888)\quad (1.737)\quad (4.611)$
$-0.002\,log(UC) + 0.059\,log(PP) - 0.025\,log(CU)$
$(-0.585)\quad (2.223)\quad (-0.477)$
$R^2 = 0.626 \qquad D\text{-}W = 1.678$
$F(6, 36) = 10.047$ Estimation Method = CORC

The t-statistics for the regression coefficients are contained in parenthesis. The R^2 is corrected for degrees of freedom. The "F" stands for the F statistics.

〔Table 4〕 Estimates of the Wholesale Price Function (1973, I - 1986, Ⅱ)

a) $log(WPI) = 2,763 + 0.131\,log(WR) + 0.219\,log(UC)$
$(2.123)\quad (2.012)\quad (3.140)$
$+ 0.010\,log(EI) + 0.078\,log(WW) + 0.440\,log(PMG)$
$(1.55)\quad (0.396)\quad (4.122)$
$+ 0.012\,T + 0.137\,log(PP) - 0.364\,log(CU)$
$(2.44)\quad (2.187)\quad (-2,547)$
$R^2 = 0.998 \qquad D\text{-}W = 2.04$
$F(8.36) = 5351.64$ Estimation Method = CORC

b) $log(WPI) = -0.526 + 0.113\,log(WR) + 0.044\,log(UC)$
$(-2.599)\quad (1.622)\quad (0.428)$
$+ 0.007\,log(EI) + 0.01\,T + 0.470\,log(PP)$
$(0.432)\quad (2.186)\quad (4.951)$
$+ 0.153\,log(CU)$
(2.626)
$R^2 = 0.99 \qquad D\text{-}W = 1.77$
$F(6.37) = 3475.41$ Estimation Method = CORC

The t-statistics for the regression coefficients are contained in parenthesis. The R^2 is corrected for degrees of freedom. The "F" stands for the F statistcis.

F values computed from both a and b in table 3 for the domestic absorption price and that from a and b in table 4 for the wholesale price index are, respectively, 7.6 and 5.6[8]. The critical value of F statistics with 1 and 39 degrees of freedome is 4.08 at the 4% level of significance. Hence, the price of imported services and the foreign export price can be regarded as a major deteminant of the domestic price. The coefficients of the imported service variables for both *PC* and *WPI* are 0.369 and 0.44, repectively. The coefficients of the foreign export price variable (*WUJ*) for both *PC* and *WPI* are estimated to be 0.624 and 0.078, respectively. This finding is consistent with past studies[9] in which the imported price is shown to be significant in our country.

Table 5-a presents the estimates of the export unit value equations. The coefficient on the variable for raw materials is 0.114 and tends to be low. But, this value is consistent with an average of the estimates obtained from input-output matrices in 1980, which is 0.31.[10] Our coefficient is less than that of the input-output matrices because the input-output coefficient focuses only on the supply factors. When the feedback effects such as those in our simultaneous system are taken into account, the input-output coefficient will be reduced. The wage rate variable is of secondary importance. The dominant variables in the export unit value equations are the wage rate and the price of imported materials, which is significant at the 1 percent level. The estimated elasticities of these two input costs' determinants is very interesting. The smaller more-open countries apparently base their export prices on competitors'

〔Table 5〕 Estimates of Export Unit Value Function (1973, I - 1986, II)

a) $log(PXG) = 3.124 + 0.016\,log(WR) + 0.065\,log(UC) + 0.007\,T$
(2.795) (2.37) (0.83) (0.998)
$+ 0.007\,log(EI) + 0.114\,log(PP) + 0.047\,log(WUJ)$
(-1.55) (2.657) (0.213)

$R^2 = 0.269$ $D\text{-}W = 1.44$

$F(6, 36) = 2.21$ Estimation Method = CORC

Estimates of the Import Unit Value Function (1973, I - 1986, II)

b) $log(PMG) = -0.006 + 0.049\,log(EI*PP) + 0.301\,log(EI*WUJ)$
(-0.452) (1.414) (9.364)

$R^2 = 0.99$ $D\text{-}W = 2.09$

$F(6.36) = 4.98$ Estimation Method = CORC

The t-statistics for the regression coefficients are contained in parenthesis. The R^2 is corrected for degrees of freedom. The "CORC" stands for the Cochrane-Orcutt procedure.

8) See, Pindyck, R. S. and Rubinfeld, D., Econometric Models and Econometric Forecasts, 2nd edition, New York : McGraw-Hill, 1983.

9) Sooyoung Kim, "The Trade Policy in Korea", *Korea International Economic Institute*, 1982 pp. 202-230.

10) See *The Input-Output Matrix in Korea*, Bank of Korea, 1985.

export prices; conversely, the larger less-open countries apparently use domestic factor costs as the prime mover of export prices. Theoretical justification for this finding is presented in Deepler and Ripley.[11] The basic idea is that the relative weight given to competitors' export prices in export price determination will vary positively both with the price elasticity of demand for a country's exports and negatively with the slope of the marginal cost curve for producing exportables. However, our results have been reversed. We can interpret this as follows. Even though Korea can be treated as a small country with a small share of world trade and limited domestic factor supplies, Korea is continuing to increase their share of trade in the U. S. and Japanese markets. This may translate in turn into an export price formation that is dominated by raw material cost and wage rate variables as shown in Table 5.

The estimation results for the import price equation are presented in Table 5-b. The estimated coefficients on the partner-country export price variables were significant at the 1 percent level. The import prices are affected strongly by foreign competitors' prices. Competitor prices are relatively more important than raw material costs in import price formation. These results are more or less in accordance with a priori expectations as to the relative market position of the U. S. and Japan in Korea. However, the results apply to a short run analysis. In the long run, prices can not diverge markedly from input costs. This implies that the importance of input costs must increase as to the length of time considered is extended.

V. CONCLUSION

In this paper we oulined the approaches that have been employed to estimate the effects of an exchange rate on domestic prices. Structural models of domestic price determination capture the price block effects of an appreciation, including the direct effects of imported intermediate and final goods and the indirect effects of upward on the prices of domestically produced goods that compete with imports. Its model allow for one or more of the following : (1) the effects of exchange rate changes on foreign prices, with feedbacks to domestic prices; (2) the effects of initial price increases on wages, with explicit feedbacks to prices; (3) the price effects of shifts in aggregate demind resulting from appreciation induced changes in real net exports

The major limitation of this analytical framework is that it tells only part of the story concerning the relationship between exchange rates and domestic prices. The other structural determinants of domestic and import prices (such as domestic and foreign labor costs, aggregate demand pressure), which are essentially treated exogenously in the analysis, can be significantly influenced by the exchange rate. Calculating the full price effect of an exchange rate changes requires plugging these structural price equations into a more complete macroeconomic model that determines

11) Deppler, M. C. and Ripley, D. M., "The World Trade Model Merchanise Trade", *I. M. F. Staff Papers*, 1978, 25 : pp. 147-206.

all of the endogenous determinants of prices. Another limitation of the analysis is that the exchange rate itself is an endogenous variable. The general equilibrium relationship between that variable and domestic prices can vary considerably, depending upon the exogenous shocks responsible for the exchange rate change.

Despite the limitations, this analysis is important because it addresses two key structural parameters within the more general relationship between exchange rates and domestic prices.

REFERENCES

[1] ARTUS, and ANNE K. MCGUIRK (1981), "A Revised Version of the Multilateral Exchange Rate Model", Staff Papers, International Monetary Fund, Washington, Vol. 28, June 275-309.

[2] DEPPLER, MICHAEL C. and DUNCAN M. RIPLEY (1958), "The World Trade Model : Merchandise Trade", I. M. F. Staff Papers Washington, Vol. 25, March 143-146.

[3] DORNBUSH, R. (1986), "Exchange Rates and Prices", *American Economic Review*, 77. 93-196

[4] DORNBUSH, RUDIGER and STANLEY FISHER, "The Open Economy : Implications for Monetary and Fiscal Policy", NBER, Working Paper 1422.

[5] HOOPER, and BARBATA LOWREY (1979), "The Impact of Dollar Depreciation on the U. S. Price Level; An Analytical Survey of Empirical Estimates", U. S. Board of Governors of the Federal Reserve System, International Finance Discussion Papers, March.

[6] ISARD, P. (1977), "How Far Can We Push the Low of One Price", *American Economic Review*, 67, 942-48.

[7] JWA SUNG HEE, "Korea's Exchange Rate Policy System, -effect and issues", KDI Working Paper, No. 8802.

[8] KALTER, R. (1978), "The Effect of Exchange Rate Changes upon International Price Discrimination", Board of Govenors of Federal Reserve, International Finance Discussion Paper No. 122, 1978.

[9] KRAVIS, I. and LIPSEY R. (1978), "Price Behavior in the Light of Balance of Payment Theories", *Journal of International Economics*, 8. 193-246.

[10] KRUGMAN P. "Pricing to Market when the Exchange Rate Changes", NBER Working Paper No. 1926, May.

[11] MCGIRK, ANNE (1983), "Oil Price Changes and Real Exchange Rate Movements Among Industrial Countries", Staff Papers, International Monetary Fund, Washington, Vol. 30. Dec. 943-84.

[12] SACHS, JEFFREY (1985), "The Dollar and Policy Mix; 1985", Brookings Papers on Economic Activity : The Brookings Institution, Washington, 117-97.

[13] SPENCER, GRANT H. (1984), "The World Trade Model : Revised Estimates", Staff Papers, Interantional Monetary Fund, Washington, Vol. 31 September 469-98.

[14] SPITALLER, ERICH (1978), "A Model of Inflation and Its Performance in the Seven Main Industrial Countries, 1958-1976", Staff Papers, International Monetary Fund, Washington, Vol. 25 June 254-77.

[15] SPITALLER, ERICH (1980), "Short Run Effects of Exchange Rate Changes on Terms of Trade and Trade Balance", Staff Papers, International Monetary Fund, Washington, Vol. 23. June 220-44.